10. Carrier ITS/CVO Technology

UNDERSTANDING ITS/CVO TECHNOLOGY APPLICATIONS

Student Manual

MODULE 10 - ITS/CVO TECHNOLOGY APPLICATIONS FOR CARRIER OPERATIONS

US Dept of Transportation

Learning Objectives

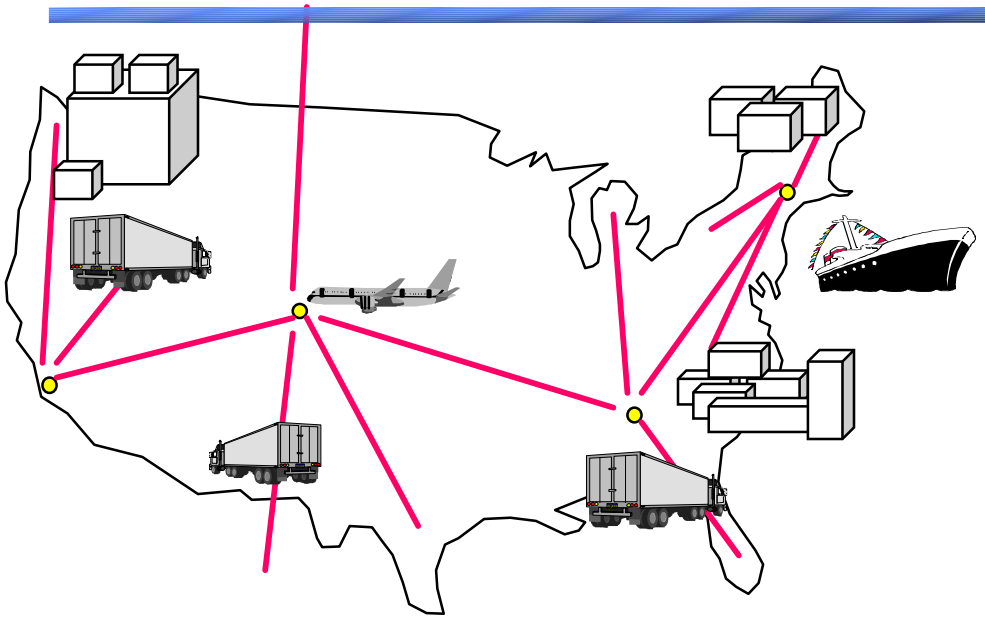
You will be able to:

- Understand how states and carriers can partner in using technology and information
- Identify actions states can take to improve freight mobility

Module Structure

- Overview of existing and emerging technologies
- Carrier/state ITS partnerships
- Questions and Wrap-up

Why do carriers use ITS technologies?



- Broad geographic coverage
- Just-in-Time Delivery

- Competitive environment
- Driver availability limitations
- Complex Schedules
- Irregular shipment sizes

Carrier Characteristics

- Small and large carriers alike work in a competitive environment with small margins.
- Carriers with many vehicles must schedule many resources at once.
- An owner/operator with only one vehicle and one driver has different schedule problems meeting deadlines with constrained time and resources.

Motor Carrier

Operational Functions

Business Management

Accounting

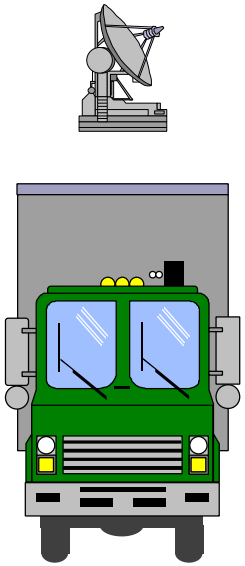
Load Information/Matching

Credentials Management

Operating Authority/Registration

Fuel Tax

Drivers' Log Auditing System



Information Management

Data Integration and Management Systems

Fleet Management

Routing and Dispatch/Mapping

Mobile Communications

Equipment and Load/ Tracking and Identification

Driver Management

Maintenance

National Carrier

Functions and Examples of Technologies

Business Management

Accounting

Business software

Driver Settlement

Load Information/Matching

Electronic Data Interchange (EDI)

Credentials Management

Operating Authority/Registration

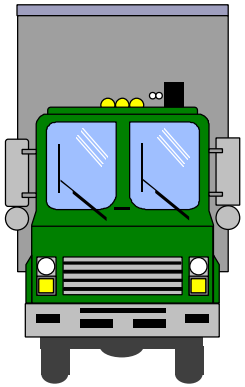
Filing and receiving credentials

Fuel Tax

Computing and reporting (EDI)

Drivers' Log Auditing System

Hours-of-Service auditing/reporting



Information Management

Data Integration and Management Systems

Fleet Management

Routing and Dispatch/Mapping

Computer-Aided Systems

Mobile Communications

In-Vehicle Communication

Equipment and Load/ Tracking and Identification

Automatic Equipment Location

Data collection and Interchange

Driver Management

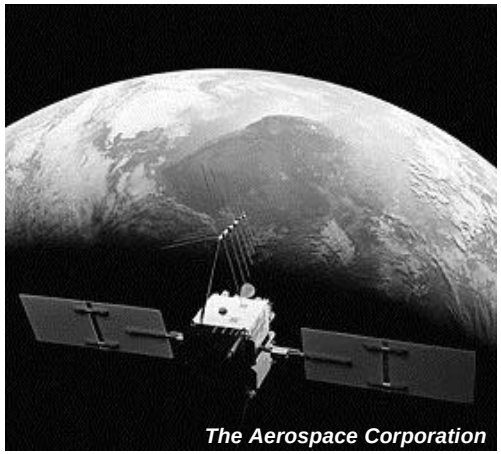
Monitoring, training, credentials

Maintenance

Preventive maintenance tracking

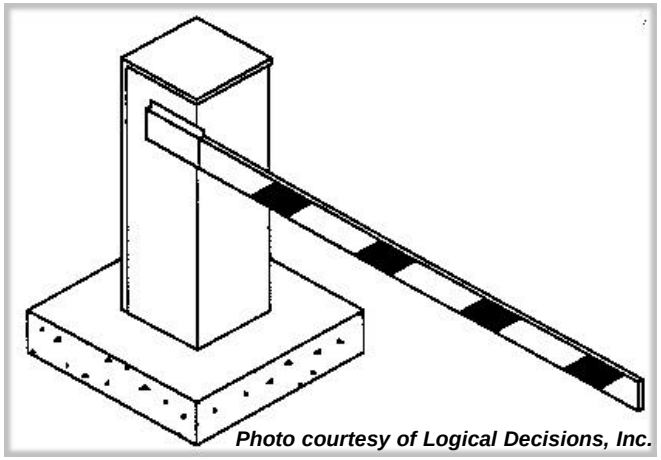
ITS can help the dispatcher

- Solutions for Load Monitoring:
  - ⇒ Identification technologies
  - ⇒ Communication
  - ⇒ On-board weighing



- Solutions for Tracking and Scheduling:
  - ⇒ Automatic Vehicle Location
  - ⇒ Identification technologies
  - ⇒ Wireless long-range communications
  - ⇒ Scheduling, mapping, and route planning software

- Solutions for Security & Access:
  - ⇒ Identification technologies



Technologies that Support Dispatch & Tracking

- Identification Technologies:
  - DSRC: Dedicated Short Range Communications
    - Wireless communication to/from the vehicle to provide data to the roadside and data and/or signals to the vehicle
    - Also called AVI (Automatic Vehicle Identification), Automatic Equipment Identification (AEI), or VRC (Vehicle to Roadside Communications)
  - Bar Codes
  - Smart Cards:
    - Card contains memory, microprocessor, and close proximity communications to relay secure information, including identification and authentication
- Automatic Vehicle Location (AVL) Technologies:
  - GPS: Global Positioning System
  - Dead reckoning (based on direction and distance)

ITS can help safety & maintenance

- Solutions for Logging and Auditing Hours:
  - ⇒ On-board computer (OBC) and sensors
  - ⇒ Communication
  - ⇒ Automatic Vehicle Location

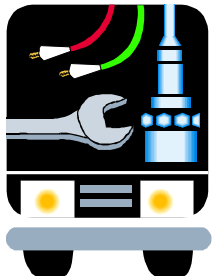


Photo courtesy of CHART

- Information on Road Traffic & Conditions:
  - ⇒ Roadside Traveler Information
  - ⇒ Internet Traveler Information Services
  - ⇒ Wireless long-range communications

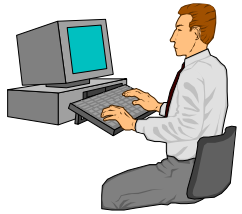
- Solutions for equipment diagnostics:
  - ⇒ On-board computer (OBC) and sensors
  - ⇒ Diagnostic software

Technologies that Support Safety & Maintenance

- On-board Computer (OBC) and sensors
  - Measure and record key values:
    - Vehicle & engine speed
    - Fuel consumption
    - Braking patterns
    - Refrigeration performance
  - Log driver inputs through keyboard entry
    - Driver's log entries
    - Fuel purchases
  - Provide interface to main carrier computer
- Communication technologies:
  - Cellular phone service
  - Mobile Satellite Communications
  - Networked mobile radio
  - Paging and messaging devices

ITS supports carrier administration

- Solutions for Business Management:
  - ⇒ EDI to support for bills of lading, invoices, etc.
  - ⇒ Electronic Credentials services for tax & credentials
  - ⇒ Business software



- Solutions to improve time & cost efficiency:
  - ⇒ Electronic Screening for weigh station bypass
  - ⇒ Electronic tolls
  - ⇒ OBC to track fuel and other on-road costs

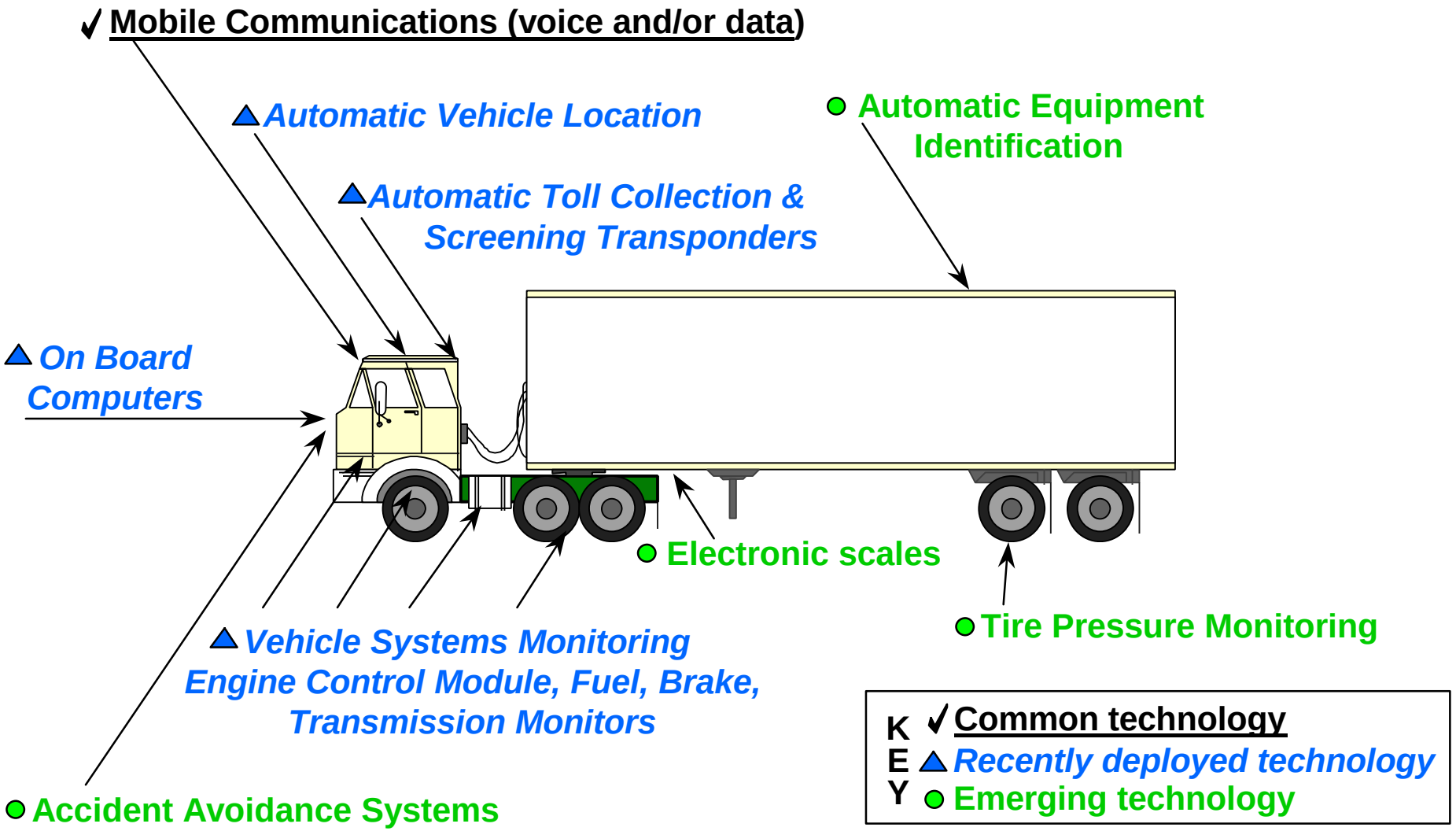
Photo courtesy of FASTRAK

Technologies that Support Carrier Administration

- EDI: Electronic Data Interchange
  - Many carriers use EDI standards to handle customer contracts and transactions electronically.
  - EDI standards can also support electronic credentials.
  - “One-Stop Shopping” for credentials can be achieved electronically.

- Electronic Screening & Electronic Tolls use DSRC
  - Existing electronic screening systems allow enrolled safe and legal vehicles to bypass some weigh stations.
  - Existing electronic toll systems allow enrolled vehicles to pay electronically and avoid stopping at toll booths.

In-Vehicle Devices are emerging to meet many needs



Emerging In-Vehicle Technologies

- Load Monitoring
  - On-board Scales
  - Reefer Monitors
  - Tank Monitors
  - Pressure Monitors
- Load Handling
  - On Board Computers
  - Computerized Manifests
- Accident Avoidance
  - Proximity Warning Systems
  - Drowsy Driver Systems
- Vehicle Systems Monitoring
  - Brake Monitors
- Regulatory Systems
  - Hours-of-Service Monitoring
- Vehicle Identification
  - RF Toll Transponders
  - Roadside Clearance Transponders
  - Bar Coded Equipment
- Information & Communications
  - Satellite
  - GPS
  - Telemetry for vehicle systems monitoring

ITS technologies benefit both Carriers and States

Technology	For the Carrier	For States
DSRC:	- Electronic Screening - Electronic Tolls - Access control - Fleet management	- Electronic Screening - Electronic Tolls
OBC:	- Safety diagnostics - Drivers log - equipment status (e.g. refrigeration)	- Simplified inspections - Drivers log
VMS:	- Traffic & Weather information	- Relieve congestion
EDI:	- Electronic Credentials - Invoices, Bills of lading	- Electronic Credentials
Internet:	- Traveler Information - Marketing	- Electronic Credentials

ITS Benefits for the Carrier

- Improved safety through information
- Improved travel efficiency through better routing and fewer stops
- More focus on driving, less focus on administration, as driving and equipment logs are automated

Carrier - State Partnership Opportunities

- Advanced Traveler Information Systems (ATIS) tailored for CVO needs
- Road Weather Information Systems (RWIS)
- Incident Management

Carrier - State Partnership Opportunities

- ATIS
  - Focusing traveler information on the needs of commercial vehicle traffic can help both states and carriers. Providing current regional construction and incident information to dispatchers allows them to consider alternative routing and communicate changes to drivers on the road. Commercial vehicles are able to meet schedules, and traffic on the blocked arteries is alleviated.
- RWIS
  - Roadway weather information is crucial to safe operations of commercial vehicles. Making detailed road conditions available to commercial drivers helps them adjust their driving.
- Incident Management
  - Whenever a vehicle carrying hazardous materials is involved in an accident, information for response teams can be provided using on-line databases and high-speed communications.

ATIS Example - FleetForward

- A public/private partnership between the I-95 Corridor Coalition and the Northeast Transportation Institute, Fleet Forward, is an example of an ATIS/CVO system.
- Real-time traffic information tailored to CVO is delivered to motor carriers to efficiently and safely move goods.
- The system links information from the I-95 corridor states to provide a comprehensive picture of the status of different routes.

ATIS Example - FleetForward

- By combining information from many jurisdictions, this system provides a service tailored to the short- or long-haul carrier who operates in the I-95 corridor region.
- Dispatchers use the information to make routing decisions.
- The partners in the Fleet Forward project come from the motor carrier industry, federal and state government agencies, and private sector technology firms.

RWIS Examples

- MD CHART - Chesapeake Highways Advisories Routing Traffic
  - Sensors in the roadways around Maryland
  - Used to dispatch salt trucks or plows
- SD/ND ATWIS - Advanced Traveler Weather Information System
  - Weather data and supercomputer technology
  - Travelers with cellular phones can access precise weather reports and forecasts on several major travel routes in the Dakotas.

RWIS Examples

- Through a series of variable message signs (VMSs) and Travelers Advisory Radio (TAR) broadcasts, the CHART system is also able to advise motorists of alternative routes they can use to avoid delays, congestion, and potential problems.
- ATWIS also provides special weather reports and forecasts several times daily to highway maintenance crews in both states. State and some local agencies receive weather information via electronic mail and the Internet, and use it to schedule their snow plowing activities in over fifty geographical zones in North and South Dakota.

Recap & Questions

The learning objectives . . .

- Understand how states and carriers can partner in using technology and information
- Identify actions states can take to improve freight mobility

Any questions?